Tutorial Sheet 6
(Truth Tables)

1. Construct a truth table for each of the following compound propositions.
    (a) $p \wedge \sim p$
    (b) $p \vee \sim p$
    (c) $(p \vee \sim q) \to q$
    (d) $(p \vee q) \to (p \wedge q)$
    (e) $(p \to q) \leftrightarrow (\sim q \to \sim p)$
    (f) $(p \to q) \to (q \to p)$

2. Use truth tables to verify the distributive law $p \wedge (q \vee r) \equiv (p \wedge q) \vee (p \wedge r)$.

3. Show that each of the following implications is a tautology by using truth tables.
    (a) $(p \wedge q) \to p$
    (b) $p \to (p \vee q)$
    (c) $\sim p \to (p \to q)$

4. Determine whether $(\sim q \wedge (p \to q)) \to \sim p$ is a tautology.

5. Show that $(p \to q) \to r$ and $p \to (q \to r)$ are not equivalent.

6. (a) Convert the following argument to its symbolic form.

        If interest rates go up, then stock market prices will go down.
        Interest rates are not going up.
        Therefore, stock market prices will not go down.

    (b) Determine whether the argument in (a) is valid.